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Harold C. Moore

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Signature

January 5, 2004

Date of Signature

Re: Application of: Williams et al.
Serial No.: 09/942,330
Filed: August 29, 2001
For: Arrangement and Method for Abating
Effluent from a Process
Group Art Unit: 1763
Examiner: Rudy Zervigon
Our Docket No.: 01-330 (1003-0607)

BRIEF ON APPEAL

Sir:

This is an appeal under 37 CFR § 1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection of claims 1-14 and 21-24 of the above-identified patent application. These claims were indicated as finally rejected in an Office Action dated September 9, 2003. Three copies

of the brief are filed herewith. Please charge \$330.00 to Deposit Account 12-2252 to cover the fee required under 37 CFR § 1.17(f). Also, please provide any extension of time which may be necessary and charge any fees which may be due to Deposit Account No. 13-0014, but not to include any payment of issue fees.

(1) REAL PARTY IN INTEREST

LSI Logic Corporation is the owner of this patent application, and therefore the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this patent application.

(3) STATUS OF CLAIMS

Claims 1-14 and 21-26 are pending in the application. The Examiner has withdrawn claims 25 and 26 from consideration.

Claims 1-14 and 21-24 stand rejected and form the subject matter of this appeal. Claims 1-14 and 21-26 are shown in the Appendix attached to this Appeal Brief.

(4) STATUS OF AMENDMENTS

Applicants filed a Response to Office Action dated June 12, 2003 ("Response") responsive to an Office Action dated March 12, 2003. A final Office Action dated September 9, 2003 was designated by the Examiner to be responsive to the Response.

(5) SUMMARY OF THE INVENTION

Independent claim 1 is directed to a process effluent abatement arrangement that includes an enclosure, a first partition, a gas connector, a gas dispenser and an exit port. The enclosure defines an interior void. (See, for example, element 14 of Fig. 1). A first partition has a first orifice defined therein and is positioned within said interior void such that (i) the first partition divides the interior void into a first chamber and a second chamber and (ii) the first orifice is in fluid communication with said first chamber and said second chamber. Referring to Fig. 1 by way of nonlimiting example, a partition 16 divides the void 14 into a first chamber 40 and a second chamber 42. In the exemplary embodiment, the second chamber 42 has a number of subchambers 44, 46 etc. (Specification at p.8, lines 3-7). The partition 16 includes an orifice 18 that is in fluid communication with the first chamber 40 and the second chamber 42. (See Fig. 1 and specification at p.7, lines 17-20 and p.8, lines 19-21).

Referring again to the summary of claim 1, the gas connector has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with the passageway. The passageway has an inlet and an outlet and is in direct fluid communication with said first chamber of the enclosure. With reference to the nonlimiting example of Fig. 1, a gas connector 68 has (i) a passageway 70 defined therethrough and (ii) a gas port 72 in fluid communication with the passageway 70. The passageway 70 includes an inlet 74 and an outlet 76. (See Fig. 1 and specification at p. 7, lines 2-5). Referring again to the general summary of the invention, the gas port is disposed downstream of the inlet and upstream of said outlet. (See e.g., the gas port 72, inlet 74 and outlet 76 of Fig. 1).

The gas dispenser is in direct fluid communication with the second chamber of the enclosure. The exit port is in fluid communication with said interior void. In the exemplary embodiment of Fig. 1, a gas dispenser 78 is in direct fluid communication with the subchamber 48 of the second chamber 42. (See Fig. 1 and specification at p.11, lines 10-16). An exit port 80 is in fluid communication with the void 14. (See Fig. 1).

Claim 2 is directed to embodiments of the invention in which the second chamber has a second partition having an orifice therein. The orifices of the first partition and second partition have central axes that are offset from one another. (See, e.g., axes 56 and 58 of orifices 28 and 30, respectively, of Fig. 1).

Claim 22 is directed to embodiments of the invention in which the first orifice of the first partition is aligned with the longitudinal axis of the enclosure. (See, e.g., axes 56 of orifice 28).

(6) ISSUES

Whether claims 1, 2, 8, 10, 22 and 24 are unpatentable under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,311,671 to Notman (hereinafter “Notman”).

Whether claims 3-6, 21 and 23 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Notman.

Whether claims 7 and 11 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,137,701 to Mundt (hereinafter “Mundt”) in view of Notman.

Whether claim 9 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Notman in view of U.S. Patent No. 5,384,051 to McGinness.

Whether claims 12-14 are unpatentable under 35 U.S.C. §103(a) as being obvious over Mundt in view of Notman and McGinness.

(7) GROUPING OF CLAIMS

The claims do not all stand or fall together.

Claims 1-6 and 8-10 form a first separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 22 and 24 form a second separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 21 forms a third separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 23 forms a fourth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 11-14 form a fifth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 7 forms a sixth separately patentable group which is argued independently of the other claims for purposes of this appeal.

(8) ARGUMENT

First Claim Grouping: **Claims 1-6 and 7-10 are Not Unpatentable Over the Prior Art**

Discussion re: Patentability of Claim 1

1. Claim 1

Claim 1 stands rejected as allegedly being anticipated by Notman. Claim 1 includes the following limitations:

a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure, said gas port being downstream of said inlet and upstream of said outlet;

Thus, a gas connector has a passageway with and inlet and an outlet. The gas connector also includes a gas port in fluid communication with the passageway downstream of the inlet and upstream of the outlet.

2. Notman Does Not Teach a Gas Connector and Gas Port as Claimed

Notman does not teach, suggest or disclose all of the elements of claim 1. In particular, Notman does not teach, suggest or disclosed a gas connector having a gas port that is downstream of its inlet and upstream of its outlet.

The Examiner has alleged that the main feed 34 of Notman constitutes the claimed gas connector inlet and the feed holes 32 of Notman constitute the claimed gas connector outlet. The Examiner has further alleged that the sparger 30 of Notman constitutes the gas port. (Final Office Action at p. 3). The Examiner appears to allege that the claimed gas connector passageway is the heat exchanger 40. (See Final Office

Action at p.3 and Notman, Fig. 1).

Even assuming that the main feed 34, feed holes 32 and heat exchanger 40 constitute a gas connector, and even assuming that the sparger 30 constitutes a gas port as alleged by the Examiner, the gas port (sparger 30) is *not* both downstream of the gas inlet (main feed 34) and upstream of the gas outlet (feed holes 32). The alleged gas port of Notman is clearly *downstream of both* the main feed 34 *and* the feed holes 32. This relationship is unambiguously shown in Fig. 1. Specifically, gas enters the main feed 34, exits the feed holes 32 and then, after exiting the feed holes, mixes with gas from the sparger 30. The sparger 30 is thus clearly downstream of the feed holes 32 because the gasses do not mix until after the gas exits the feed holes 32. (See Notman Fig. 1).

In the Final Office Action, however, the Examiner alleged that the sparger 30 of Notman was both upstream of the feed holes 32 and downstream of the main feed 34. The Examiner provided the following reasoning:

The Examiner’s “downstream” interpretation is the direction that is the same as the gas flow direction through the gas connector. And so the gas port is further down along the direction of the gas flow of the gas connector inlet. The Examiner’s “upstream” interpretation is the direction that is counter to the gas flow direction through the gas connector. And so the gas port is further up counter to the direction of the gas flow of the gas connector outlet.

(Final Office Action at p.3).

It is unclear what the Examiner means when the Examiner says that the “gas port is further up counter to the direction of the gas flow of the gas connector outlet”. If the gas port is the sparger 30 and the gas connector outlet is the feed hole 32, then the sparger 30 is plainly further *down*, not further *up*, from the gas connector outlet. (See Notman, Fig. 1).

However, it is possible that the Examiner is alleging that “downstream” means further down in the direction of the flow, and that “upstream” means further up, but

further up in the direction opposite the flow. In other words, the Examiner may be alleging that “upstream” and “downstream” are the same direction. If so, then it is submitted that the Examiner’s rejection is based on an incorrect interpretation of the normal understanding of the terms upstream and downstream.

Under a normal understanding of the terms upstream and downstream, the gas port as claimed is situated between the gas inlet and gas outlet. Notman clearly fails to disclose any such port in the structure that Notman contends is the claimed gas connector.

For the foregoing reasons, it is respectfully submitted that Notman fails to disclose or suggest each and every element of claim 1. As a consequence, the anticipation rejection is in error and should be reversed.

Discussion re: Patentability of Claim 2, 8 and 10

Claims 2, 8 and 10 also stand rejected as allegedly being anticipated by Notman. Claims 2, 8 and 10 all depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that claims 2, 8 and 10 are patentable over the prior art.

Discussion re: Patentability of Claims 3-6

Claims 3-6 stand rejected as allegedly being obvious over Notman. Claims 3-6 all depend from and incorporate all the limitations of claim 1. Claims 3-6 further contain limitations directed to additional partitions in the enclosure. The Examiner alleged that the additional partitions would have been an obvious modification of Notman.

Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port that is upstream of the gas connector outlet and downstream of the gas connector inlet, as called for in claim 1. Accordingly, claims 3-6 are patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

Discussion re: Patentability of Claim 9

Claim 9 stands rejected as allegedly being obvious over Notman in view of McGinness. Claim 9 depends from and incorporates all the limitations of claim 8. Claim 9 further contains limitations directed to an electrical heating element. The Examiner alleged that the electrical heating element, which is allegedly disclosed in McGinness, would have been an obvious modification of Notman. Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port that is upstream of the gas connector outlet and downstream of the gas connector inlet, as called for in claim 1. Accordingly, claim 9 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

Second Claim Grouping: Claims 22 and 24 are Not Anticipated by Notman

Discussion re: Patentability of Claim 22

1. Claim 22 is Different than Claim 1

While claim 22 contains some limitations that are similar to those of claim 1, claim 22 does not include a limitation directed to the location of a gas port upstream of the gas outlet and downstream of the gas inlet. Accordingly, not all of the arguments

provided above in connection with claim 1 apply to claim 22.

Claim 22, nevertheless, includes the following limitations:

a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber

....

said first orifice has a first central axis that is substantially aligned with the longitudinal axis of the enclosure;

Thus, the orifice in the first partition is centrally located, or “aligned with the longitudinal axis” of the enclosure.

2. The Rejection of Claim 22 is in Error

Notman does not disclose a first orifice as claimed. In the Final Office Action, the Examiner alleged that the grid 16a of Notman constitutes a first partition as claimed and that it has a central opening that constitutes the first orifice. This central opening is the opening through which the tubes 26 and 42 pass. (Final Office Action at p.4 and Notman, Fig. 1). That central opening, however, does *not* satisfy the limitations of the first orifice as claimed in claim 1.

In particular, the central opening in the grid 16a of Notman is not in fluid communication with first and second chambers, as called for in claim 1. To this end, it is noted that the Examiner alleged that the catalyst beds 12a and 12b of Notman constitute the claimed first and second chambers. (Final Office Action at p.3). The central opening of the grid 16a is *not in communication with* those catalyst beds 12a and 12b. The central opening is provided to allow the tubes 26 and 42 to pass. (See Notman, Fig. 1). While gas passes through the tubes 26 and 42, the tubes 26 and 42 do *not* have openings into

either of the catalyst beds 12a and 12b. (See *id.*)

The Examiner nevertheless maintains that gas does pass between the catalyst beds 12a and 12b through the central opening. In particular, the Examiner alleged that “the first central axis is further *unobstructed* such that gas can pass (see flow arrows) from the first chamber to the second chamber through the first central axis.” (Final Office Action at p.4) (emphasis added). In other words, the Examiner appears to be alleging that gas may freely pass from the chamber 12a to the chamber 12b through the tubes 26 and 42. It is respectfully submitted that the Examiner has mischaracterized the nature of the tubes 26 and 42. Those tubes do *not* allow gas to flow from the first chamber 12a to the second chamber 12b. Gas may pass between the two chambers 12a and 12b through the off-center opening 36a, but not through the tubes 26 and 42 in the central axis of the device.

Accordingly, Notman fails to show a first orifice in communication with the first and second chambers, and which has a central axes aligned with a longitudinal axis of the enclosure as claimed. For at least this reason, it is respectfully submitted that the rejection of claim 22 as allegedly being anticipated by Notman is in error and should be withdrawn.

Discussion re: Patentability of Claim 24

Claim 24 also stands rejected as allegedly being anticipated by Notman. Claim 24 depends from and incorporates all of the limitations of claim 22. Accordingly, for at least the same reasons as those set forth above in connection with claim 22, it is respectfully submitted that claim 24 is patentable over the prior art.

**Third Claim Grouping: Claim 21 is Not Obvious
 Over Notman**

Discussion re: Patentability of Claim 21

1. Claim 21 depends from Claim 1

As an initial matter, claim 21 depends (indirectly) from and incorporates all the limitations of claim 1. Accordingly, claim 21 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

2. Additional Limitations of Claim 21

Claim 21 depends on claim 2, which further recites a second partition in the enclosure, as well as a second orifice in the second partition. Claim 21 also recites the following limitations:

said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

As a consequence, the first orifice is the largest orifice of the first partition and has a central axis that is offset from the central axis of the largest orifice of the second partition.

3. Notman Does Not Teach or Suggest Partitions with Offset Orifices

Notman does not disclose a device having first and second partitions having offset largest orifices. In particular, the Examiner has alleged that the first and second partitions of Notman are the catalyst beds 12a and 12b. The Examiner admitted, however, that "Notman does not teach that his first and second orifice comprise the largest orifice in his first and second partitions respectively such that the central axis of the first and second

orifice are offset relative to each other." (Final Office Action at p.5).

The Examiner contended, nevertheless, that:

"It would have been obvious to one of ordinary skill in the art . . . to optimize the dimension of Notman's orifice in each of the first and second partitions such that the largest orifice of each partition produce axis that are offset relative to each other. . .

Motivation . . . to optimize the dimension of Notman's orifice in each of the first and second partitions such that the largest orifice of each partition produce axis that are offset relative to each other, . . . is to provide for longer residence time for the flowing gasses (column 3, lines 7-8; column 4, lines 12-17).

(Final Office Action at p.6). Applicants submit that the Examiner has not alleged a legally sufficient motivation or suggestion to modify Notman's device to include largest orifices in the two partitions that have offset central axes.

First, contrary to the Examiner's assertions, Notman does not suggest the desirability of providing longer residence time for the flowing gasses. Second, Notman does not suggest that the use of partitions having offset largest orifices would provide longer gas residence time.

With regard to the desirability of providing longer residence time, the Examiner cited Notman at columns 3 and 4. (Final Office Action at p.6). The passages cited by the Examiner as providing support for this proposition are set forth below:

. . . united. More than two subdivisions can be provided, but at the cost of some complexity in piping.

. . .

. . . higher pressures. The volume space velocity through the total catalyst is suitably in the range of 5000-50,000 hour⁻¹. The gas passed over the catalyst is normally a mixture of fresh synthesis gas and unreacted gas recycled from methanol recovery by cooling, condensation and separation.

(Notman at col. 3, lines 7-8 and col. 4, lines 12-17).

Nowhere in the above cited passages is there any remote implication that there is a desire to increase gas residence time. There certainly is no teaching or suggestion in the prior art that employing two largest orifices in partitions such that they are offset with

respect to each other constitutes a desirable or efficient manner to increase gas residence time.

For at least these reasons, it is respectfully submitted that the Examiner has failed to set forth a *prima facie* case of obviousness with respect to claim 21. Accordingly, for reasons independent of those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claim 21 is in error and should be reversed.

**Fourth Claim Grouping: Claim 23 is Not Obvious
Over Notman**

Discussion re: Patentability of Claim 23

1. Claim 23 depends from Claim 22

As an initial matter, claim 23 depends from and incorporates all the limitations of claim 22. Accordingly, claim 23 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 22.

2. Additional Limitations of Claims 23

Claims 23 also recites the following limitations:

the gas port is disposed between the inlet and the outlet of the passageway

Accordingly, claim 23 adds a limitation similar to that discussed above in connection with claim 1.

As discussed above, Notman does not disclose a gas port disposed between the inlet and the outlet of the passageway of the gas connector. In contrast to the rejection of

claim 1, however, the Examiner does not allege that Notman *teaches* such a limitation in connection with claim 23. (Final Office Action at p.5). Instead, the Examiner merely asserts that it would have been *obvious* to “optimize the dimension (height) of Notman’s gas connector passageway such that his gas port is disposed between the inlet and outlet of his passage way . . . to provide for longer residence time for the flowing gasses.” (*Id.* at p.6).

Again, the motivation cited by the Examiner for such a modification is allegedly to “provide for longer residence time for the flowing gasses.” As discussed above in connection with claim 21, Notman does not disclose any necessity or desirability for “provid[ing] for longer residence time for the flowing gasses”. As a consequence, the Examiner has not provided a legally sufficient motivation or suggestion to modify Notman.

In addition, the Examiner proposed that optimizing the height of the gas connector would somehow result in the gas port being disposed between the inlet and the outlet of the gas connector passageway. The Examiner’s proposition that optimizing the height of the gas connector would result in the repositioning of the gas port in a manner consistent with claim 1 is merely speculative. Even if there were a motivation to change the height of the heat exchanger 40 (the alleged gas connector), that could be accomplished in any number of ways without the sparger 30 being located between the main feed 34 and the feed holes 32 of Notman.

For all of the above reasons, it is respectfully submitted that the obviousness rejection should be reversed for reasons independent of those set forth above in connection with claim 21.

Fifth Claim Grouping: **Claims 11-14 are Not Obvious Over Mundt in view of Notman**

Discussion re: Patentability of Claim 11

1. Claim 11

Claim 11 is directed to an arrangement for abating effluent that includes an enclosure, a gas connector, a gas dispensor, an exit port and an etch apparatus. The enclosure, gas connector, gas dispensor and exit port include many, but not all of the limitations of corresponding elements of claim 1. Claim 11, however, cites the following additional limitations corresponding to the etch apparatus:

an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

2. The Examiner's Rejection of Claim 11

The Examiner rejected claim 11 as allegedly being obvious over Mundt in view of Notman. The Examiner admitted that Notman does not teach the claimed etch apparatus. Instead, the Examiner contended that it would have been obvious to replace Mundt's process effluent abatement arrangement with the catalytic gas reactor of Notman. (Final Office Action at p.7).

In particular, the Examiner cited the following reasoning for modifying the process effluent abatement arrangement of Mundt:

Motivation to replace Mundt's process effluent abatement arrangement with Alan Notman's catalytic gas reactor to process the effluent from Mundt's etch apparatus is to reduce the hazardous process chemicals from the etch reactor as taught by Mundt (column 1, lines 22-33).

(Final Office Action at p.7).

3. The Examiner Has Not Identified A Legally Sufficient Motivation to Combine

The above-quoted paragraph does not establish a legally sufficient motivation or suggestion to modify Mundt as proposed by the Examiner. Applicants respectfully submit that Mundt does not suggest that a catalytic converter of the type disclosed in Notman would reduce hazardous process chemicals. The passages of Mundt cited by the Examiner in support of this proposition are set forth below:

One example of a technology which may readily implement the present invention is the semiconductor fabrication industry. This industry is making increased use of low pressure operations such as plasma etching, plasma assisted deposition and the like. These processes require sophisticated vacuum pumping systems having expensive parts and often using expensive, inert pump oil. Since corrosive gases are utilized in these processes, the unreacted gases or the reaction by-products of these gases can be harmful to the pump system; it is thus desirable that they be treated prior to their passage into the pump mechanism. Presently, the treatment of these materials is done in two ways.

(Mundt at col. 1, lines 22-33).

The above-cited portions of Mundt do not suggest that the effluent abatement arrangement taught by Mundt should be replaced at all, much less replaced by the catalytic converter taught by Notman. Mundt adequately describes a reaction chamber specially designed for use in the abatement of effluents in an etch apparatus. (See *id.* at cols. 5 and 6). Nothing in Mundt suggests replacing this reaction chamber with a different structure that has otherwise been designed for a different purpose.

In particular, Notman is directed to a device used for the exothermic synthesis of ammonia or methanol. (Notman at col. 1, lines 4-6). Nothing in Mundt suggests a device that performs exothermic synthesis of ammonia or methanol would be an adequate replacement for the reaction chamber of Mundt, much less a *desirable* replacement.

Accordingly, the Examiner has not set forth a legally sufficient motivation or suggestion to replace the effluent abatement apparatus of Mundt with the exothermic synthesis reactor of Notman. For at least this reason, the obviousness rejection of claim 7 is in error and should be reversed.

Discussion re: Patentability of Claims 12-14

Claims 12-14 stand rejected over Mundt in view of Notman in further view of McGinness. Claims 12-14 all depend from and incorporate all of the limitations of claim 11. As discussed above, there is no legally sufficient motivation or suggestion to combine Mundt and Notman as proposed by the Examiner. McGinness does not supply the missing motivation or suggestion. Accordingly, for at least the same reasons as those set forth above in connection with claim 11, it is respectfully submitted that claims 12-14 are patentable over the prior art.

**Sixth Claim Grouping: Claim 7 is Not Obvious
Over Mundt in view of Notman**

Discussion re: Patentability of Claim 7

1. Claim 7 depends from Claim 1

As an initial matter, claim 7 depends from and incorporates all the limitations of claim 1. While the rejection of claim 7 is over Mundt in view of Notman, Mundt does not overcome the deficiencies of Notman with respect to claim 1, discussed above. Accordingly, claim 7 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

2. Additional Limitations of Claims 7

Claims 7 also recites the following limitations:

an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

As discussed above in connection with claim 11, there is no motivation or suggestion to combine Mundt and Notman as proposed by the Examiner. Accordingly, for reasons independent of those set forth above in connection with claim 1, it is submitted that the obviousness rejection of claim 7 is in error and should be reversed.

(9) CONCLUSION

For all of the foregoing reasons, claims 1-3, 5, 8, 10, 17-21, 27-34 and 39-45 are not unpatentable under 35 U.S.C. § 102(b), and claims 4, 6, 7, 9, 11-16, 22-26 and 35-38 are not unpatentable under 35 U.S.C. § 103(a). As a consequence, the Board of Appeals is respectfully requested to reverse the rejection of these claims.

Respectfully submitted,



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CLAIM APPENDIX

1. (amended) A process effluent abatement arrangement, comprising:
 - an enclosure which defines an interior void;
 - a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber;
 - a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure, said gas port being downstream of said inlet and upstream of said outlet;
 - a gas dispenser in direct fluid communication with said second chamber of said enclosure; and
 - an exit port in fluid communication with said interior void.

2. The arrangement of claim 1, further comprising:
 - a second partition having a second orifice defined therein, wherein (i) said second partition is positioned within said second chamber, (ii) said first orifice has a first central axis, (iii) said second orifice has a second central axis, and (iv) said second central axis of said second orifice is offset relative to said first central axis of said first orifice.

3. The arrangement of claim 2, further comprising:

a third partition having a third orifice defined therein;

a fourth partition having a fourth orifice defined therein;

a fifth partition having a fifth orifice defined therein; and

a sixth partition having a sixth orifice defined therein,

wherein said second partition, said third partition, said fourth partition, said fifth partition, and said sixth partition are all positioned within said second chamber such that said second chamber is divided into a first sub-chamber, a second sub-chamber, a third sub-chamber, a fourth sub-chamber, a fifth sub-chamber, and a sixth sub-chamber.

4. The arrangement of claim 3, wherein:

each of said first partition, said second partition, said third partition, said fourth partition, said fifth partition, and said sixth partition are spaced apart along a longitudinal axis of said enclosure so that said longitudinal axis passes through a center point P_1 of said first partition, a center point P_2 of said second partition, a center point P_3 of said third partition, a center point P_4 of said fourth partition, a center point P_5 of said fifth partition, and a center point P_6 of said sixth partition, and

said second partition is positioned adjacent to said first partition such that (i) said first sub-chamber is interposed said first partition and said second partition and (ii) said first orifice is in direct fluid communication with said first chamber and said first sub-chamber,

said third partition is positioned adjacent to said second partition such that (i) said second sub-chamber is interposed said second partition and said third partition and (ii) said second orifice is in direct fluid communication with said first sub-chamber and said second sub-chamber,

said fourth partition is positioned adjacent to said third partition such that (i) said third sub-chamber is interposed said third partition and said fourth partition and (ii) said third orifice is in direct fluid communication with said second sub-chamber and said third sub-chamber,

said fifth partition is positioned adjacent to said fourth partition such that (i) said fourth sub-chamber is interposed said fourth partition and said fifth partition and (ii) said fourth orifice is in direct fluid communication with said third sub-chamber and said fourth sub-chamber,

said sixth partition is positioned adjacent to said fifth partition such that (i) said fifth sub-chamber is interposed said fifth partition and said sixth partition and (ii) said fifth orifice is in direct fluid communication with said fourth sub-chamber and said fifth sub-chamber, and

an end wall of said enclosure is positioned adjacent to said sixth partition such that (i) said sixth sub-chamber is interposed said end wall and said sixth partition and (ii) said sixth orifice is in direct fluid communication with said fifth sub-chamber and said sixth sub-chamber.

5. The arrangement of claim 4, wherein:

said third orifice has a third central axis and said third central axis of said third orifice is offset relative to said second central axis of said second orifice,

said fourth orifice has a fourth central axis and said fourth central axis of said fourth orifice is offset relative to said third central axis of said third orifice,

said fifth orifice has a fifth central axis and said fifth central axis of said fifth orifice is offset relative to said fourth central axis of said fourth orifice, and

said sixth orifice has a sixth central axis and said sixth central axis of said sixth orifice is offset relative to said fifth central axis of said fifth orifice.

6. The arrangement of claim 5, wherein:

said longitudinal axis divides said enclosure into a first half and a second half,

said first central axis of said first orifice is aligned with said longitudinal axis,

said second orifice of said second partition, said fourth orifice of said fourth partition, and said sixth orifice of said sixth partition are located within said first half of said enclosure, and

said third orifice of said third partition and said fifth orifice of said fifth partition are located within said second half of said enclosure.

7. The arrangement of claim 1, further comprising:
an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

8. The apparatus of claim 1, further comprising:
a gas source containing a gas, said gas source being in fluid communication with said gas port of said gas connector such that said gas contained by said gas source is advanced into said passageway of said gas connector.

9. The apparatus of claim 8, further comprising:
an electrical heating element which is in thermal communication with said gas provided by said gas source so that said gas is heated prior to being advanced into said passageway of said gas connector.

10. The apparatus of claim 1, further comprising:

a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said second chamber of said enclosure.

11. An arrangement for abating effluent, comprising:
 - an enclosure which defines an interior void;
 - a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in fluid communication with said interior void of said enclosure;
 - a gas dispenser in fluid communication with said interior void of said enclosure;
 - an exit port in fluid communication with said interior void of said enclosure; and
 - an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.
12. The arrangement of claim 11, further comprising:
 - a gas source containing a gas, said gas source being in fluid communication with said gas port of said gas connector such that said gas contained by said gas source is advanced into said passageway of said gas connector; and
 - a heating element which is in thermal communication with said gas provided by said gas source so that said gas is heated prior to being advanced into said passageway of said gas connector.

13. The arrangement of claim 12, further comprising:

a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said interior void of said enclosure.

14. The arrangement of claim 13, further comprising:

a first partition having a first orifice defined therein, said first partition being positioned within said interior void of said enclosure such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber; and

a second partition having a second orifice defined therein, wherein (i) said gas connector is in fluid communication with said interior void such that said etch gas product generated by said etch apparatus is advanced directly into said first chamber of said interior void, (ii) said second partition is positioned within said second chamber of said interior void, (iii) said gas dispenser is in fluid communication with said interior void such that said humidified gas is advanced directly into said second chamber of said interior void, (iv) said first orifice has a first central axis, (v) said second orifice has a second central axis, and (vi) said second central axis of said second orifice is offset relative to said first central axis of said first orifice.

21. The arrangement of claim 2, wherein said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

22. A process effluent abatement arrangement, comprising:

an enclosure which defines an interior void and a longitudinal axis;

a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber;

a second partition having a second orifice defined therein, wherein (i) said second partition is positioned within said second chamber, (ii) said first orifice has a first central axis that is substantially aligned with the longitudinal axis of the enclosure, said first central axis being unobstructed such that gas can pass from the first chamber to the second chamber through the first central axis, (iii) said second orifice has a second central axis, and (iv) said second central axis of said second orifice is offset relative to said first central axis of said first orifice;

a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure;

a gas dispenser in direct fluid communication with said second chamber of said enclosure; and

an exit port in fluid communication with said interior void.

23. The arrangement of claim 22, wherein the gas port is disposed between the inlet and the outlet of the passageway.

24. The arrangement of claim 22, further comprising:
a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said second chamber of said enclosure.

25. The method of claim 22, wherein said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

26. The method of claim 25, further comprising at least one additional partition in addition to said first partition and said second partition, each said additional partition having a respective largest orifice, said longitudinal axis dividing said enclosure into a first half and a second half, said largest orifices of said first partition, said second partition, and said at least one additional partition being alternatingly disposed in said first half and said second half.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

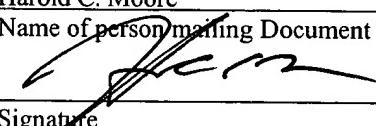
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Harold C. Moore

Name of person mailing Document or Fee


Signature

January 5, 2004

Date of Signature

Re: Application of: Williams et al.
Serial No.: 09/942,330
Filed: August 29, 2001
For: Arrangement and Method for Abating
Effluent from a Process
Group Art Unit: 1763
Examiner: Rudy Zervigon
Our Docket No.: 01-330 (1003-0607)

BRIEF ON APPEAL

Sir:

This is an appeal under 37 CFR § 1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection of claims 1-14 and 21-24 of the above-identified patent application. These claims were indicated as finally rejected in an Office Action dated September 9, 2003. Three copies

of the brief are filed herewith. Please charge \$330.00 to Deposit Account 12-2252 to cover the fee required under 37 CFR § 1.17(f). Also, please provide any extension of time which may be necessary and charge any fees which may be due to Deposit Account No. 13-0014, but not to include any payment of issue fees.

(1) REAL PARTY IN INTEREST

LSI Logic Corporation is the owner of this patent application, and therefore the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this patent application.

(3) STATUS OF CLAIMS

Claims 1-14 and 21-26 are pending in the application. The Examiner has withdrawn claims 25 and 26 from consideration.

Claims 1-14 and 21-24 stand rejected and form the subject matter of this appeal.

Claims 1-14 and 21-26 are shown in the Appendix attached to this Appeal Brief.

(4) STATUS OF AMENDMENTS

Applicants filed a Response to Office Action dated June 12, 2003 ("Response") responsive to an Office Action dated March 12, 2003. A final Office Action dated September 9, 2003 was designated by the Examiner to be responsive to the Response.

(5) SUMMARY OF THE INVENTION

Independent claim 1 is directed to a process effluent abatement arrangement that includes an enclosure, a first partition, a gas connector, a gas dispenser and an exit port. The enclosure defines an interior void. (See, for example, element 14 of Fig. 1). A first partition has a first orifice defined therein and is positioned within said interior void such that (i) the first partition divides the interior void into a first chamber and a second chamber and (ii) the first orifice is in fluid communication with said first chamber and said second chamber. Referring to Fig. 1 by way of nonlimiting example, a partition 16 divides the void 14 into a first chamber 40 and a second chamber 42. In the exemplary embodiment, the second chamber 42 has a number of subchambers 44, 46 etc. (Specification at p.8, lines 3-7). The partition 16 includes an orifice 18 that is in fluid communication with the first chamber 40 and the second chamber 42. (See Fig. 1 and specification at p.7, lines 17-20 and p.8, lines 19-21).

Referring again to the summary of claim 1, the gas connector has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with the passageway. The passageway has an inlet and an outlet and is in direct fluid communication with said first chamber of the enclosure. With reference to the nonlimiting example of Fig. 1, a gas connector 68 has (i) a passageway 70 defined therethrough and (ii) a gas port 72 in fluid communication with the passageway 70. The passageway 70 includes an inlet 74 and an outlet 76. (See Fig. 1 and specification at p. 7, lines 2-5). Referring again to the general summary of the invention, the gas port is disposed downstream of the inlet and upstream of said outlet. (See e.g., the gas port 72, inlet 74 and outlet 76 of Fig. 1).

The gas dispenser is in direct fluid communication with the second chamber of the enclosure. The exit port is in fluid communication with said interior void. In the exemplary embodiment of Fig. 1, a gas dispenser 78 is in direct fluid communication with the subchamber 48 of the second chamber 42. (See Fig. 1 and specification at p.11, lines 10-16). An exit port 80 is in fluid communication with the void 14. (See Fig. 1).

Claim 2 is directed to embodiments of the invention in which the second chamber has a second partition having an orifice therein. The orifices of the first partition and second partition have central axes that are offset from one another. (See, e.g., axes 56 and 58 of orifices 28 and 30, respectively, of Fig. 1).

Claim 22 is directed to embodiments of the invention in which the first orifice of the first partition is aligned with the longitudinal axis of the enclosure. (See, e.g., axes 56 of orifice 28).

(6) ISSUES

Whether claims 1, 2, 8, 10, 22 and 24 are unpatentable under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,311,671 to Notman (hereinafter “Notman”).

Whether claims 3-6, 21 and 23 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Notman.

Whether claims 7 and 11 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,137,701 to Mundt (hereinafter “Mundt”) in view of Notman.

Whether claim 9 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Notman in view of U.S. Patent No. 5,384,051 to McGinness.

Whether claims 12-14 are unpatentable under 35 U.S.C. §103(a) as being obvious over Mundt in view of Notman and McGinness.

(7) GROUPING OF CLAIMS

The claims do not all stand or fall together.

Claims 1-6 and 8-10 form a first separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 22 and 24 form a second separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 21 forms a third separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 23 forms a fourth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 11-14 form a fifth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 7 forms a sixth separately patentable group which is argued independently of the other claims for purposes of this appeal.

(8) ARGUMENT

First Claim Grouping: **Claims 1-6 and 7-10 are Not Unpatentable Over the Prior Art**

Discussion re: Patentability of Claim 1

1. Claim 1

Claim 1 stands rejected as allegedly being anticipated by Notman. Claim 1 includes the following limitations:

a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure, said gas port being downstream of said inlet and upstream of said outlet;

Thus, a gas connector has a passageway with an inlet and an outlet. The gas connector also includes a gas port in fluid communication with the passageway downstream of the inlet and upstream of the outlet.

2. Notman Does Not Teach a Gas Connector and Gas Port as Claimed

Notman does not teach, suggest or disclose all of the elements of claim 1. In particular, Notman does not teach, suggest or disclose a gas connector having a gas port that is downstream of its inlet and upstream of its outlet.

The Examiner has alleged that the main feed 34 of Notman constitutes the claimed gas connector inlet and the feed holes 32 of Notman constitute the claimed gas connector outlet. The Examiner has further alleged that the sparger 30 of Notman constitutes the gas port. (Final Office Action at p. 3). The Examiner appears to allege that the claimed gas connector passageway is the heat exchanger 40. (See Final Office

Action at p.3 and Notman, Fig. 1).

Even assuming that the main feed 34, feed holes 32 and heat exchanger 40 constitute a gas connector, and even assuming that the sparger 30 constitutes a gas port as alleged by the Examiner, the gas port (sparger 30) is *not* both downstream of the gas inlet (main feed 34) and upstream of the gas outlet (feed holes 32). The alleged gas port of Notman is clearly *downstream of both* the main feed 34 *and* the feed holes 32. This relationship is unambiguously shown in Fig. 1. Specifically, gas enters the main feed 34, exits the feed holes 32 and then, after exiting the feed holes, mixes with gas from the sparger 30. The sparger 30 is thus clearly downstream of the feed holes 32 because the gasses do not mix until after the gas exits the feed holes 32. (See Notman Fig. 1).

In the Final Office Action, however, the Examiner alleged that the sparger 30 of Notman was both upstream of the feed holes 32 and downstream of the main feed 34. The Examiner provided the following reasoning:

The Examiner's "downstream" interpretation is the direction that is the same as the gas flow direction through the gas connector. And so the gas port is further down along the direction of the gas flow of the gas connector inlet. The Examiner's "upstream" interpretation is the direction that is counter to the gas flow direction through the gas connector. And so the gas port is further up counter to the direction of the gas flow of the gas connector outlet.

(Final Office Action at p.3).

It is unclear what the Examiner means when the Examiner says that the "gas port is further up counter to the direction of the gas flow of the gas connector outlet". If the gas port is the sparger 30 and the gas connector outlet is the feed hole 32, then the sparger 30 is plainly further *down*, not further *up*, from the gas connector outlet. (See Notman, Fig. 1).

However, it is possible that the Examiner is alleging that "downstream" means further down in the direction of the flow, and that "upstream" means further up, but

further up in the direction opposite the flow. In other words, the Examiner may be alleging that "upstream" and "downstream" are the same direction. If so, then it is submitted that the Examiner's rejection is based on an incorrect interpretation of the normal understanding of the terms upstream and downstream.

Under a normal understanding of the terms upstream and downstream, the gas port as claimed is situated between the gas inlet and gas outlet. Notman clearly fails to disclose any such port in the structure that Notman contends is the claimed gas connector.

For the foregoing reasons, it is respectfully submitted that Notman fails to disclose or suggest each and every element of claim 1. As a consequence, the anticipation rejection is in error and should be reversed.

Discussion re: Patentability of Claim 2, 8 and 10

Claims 2, 8 and 10 also stand rejected as allegedly being anticipated by Notman. Claims 2, 8 and 10 all depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that claims 2, 8 and 10 are patentable over the prior art.

Discussion re: Patentability of Claims 3-6

Claims 3-6 stand rejected as allegedly being obvious over Notman. Claims 3-6 all depend from and incorporate all the limitations of claim 1. Claims 3-6 further contain limitations directed to additional partitions in the enclosure. The Examiner alleged that the additional partitions would have been an obvious modification of Notman.

Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port that is upstream of the gas connector outlet and downstream of the gas connector inlet, as called for in claim 1. Accordingly, claims 3-6 are patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

Discussion re: Patentability of Claim 9

Claim 9 stands rejected as allegedly being obvious over Notman in view of McGinness. Claim 9 depends from and incorporates all the limitations of claim 8. Claim 9 further contains limitations directed to an electrical heating element. The Examiner alleged that the electrical heating element, which is allegedly disclosed in McGinness, would have been an obvious modification of Notman. Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port that is upstream of the gas connector outlet and downstream of the gas connector inlet, as called for in claim 1. Accordingly, claim 9 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

Second Claim Grouping: Claims 22 and 24 are Not Anticipated by Notman

Discussion re: Patentability of Claim 22

1. Claim 22 is Different than Claim 1

While claim 22 contains some limitations that are similar to those of claim 1, claim 22 does not include a limitation directed to the location of a gas port upstream of the gas outlet and downstream of the gas inlet. Accordingly, not all of the arguments

provided above in connection with claim 1 apply to claim 22.

Claim 22, nevertheless, includes the following limitations:

a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber

....

said first orifice has a first central axis that is substantially aligned with the longitudinal axis of the enclosure;

Thus, the orifice in the first partition is centrally located, or “aligned with the longitudinal axis” of the enclosure.

2. The Rejection of Claim 22 is in Error

Notman does not disclose a first orifice as claimed. In the Final Office Action, the Examiner alleged that the grid 16a of Notman constitutes a first partition as claimed and that it has a central opening that constitutes the first orifice. This central opening is the opening through which the tubes 26 and 42 pass. (Final Office Action at p.4 and Notman, Fig. 1). That central opening, however, does *not* satisfy the limitations of the first orifice as claimed in claim 1.

In particular, the central opening in the grid 16a of Notman is not in fluid communication with first and second chambers, as called for in claim 1. To this end, it is noted that the Examiner alleged that the catalyst beds 12a and 12b of Notman constitute the claimed first and second chambers. (Final Office Action at p.3). The central opening of the grid 16a is *not in communication with* those catalyst beds 12a and 12b. The central opening is provided to allow the tubes 26 and 42 to pass. (See Notman, Fig. 1). While gas passes through the tubes 26 and 42, the tubes 26 and 42 do *not* have openings into

either of the catalyst beds 12a and 12b. (See *id.*)

The Examiner nevertheless maintains that gas does pass between the catalyst beds 12a and 12b through the central opening. In particular, the Examiner alleged that “the first central axis is further *unobstructed* such that gas can pass (see flow arrows) from the first chamber to the second chamber through the first central axis.” (Final Office Action at p.4) (emphasis added). In other words, the Examiner appears to be alleging that gas may freely pass from the chamber 12a to the chamber 12b through the tubes 26 and 42. It is respectfully submitted that the Examiner has mischaracterized the nature of the tubes 26 and 42. Those tubes do *not* allow gas to flow from the first chamber 12a to the second chamber 12b. Gas may pass between the two chambers 12a and 12b through the off-center opening 36a, but not through the tubes 26 and 42 in the central axis of the device.

Accordingly, Notman fails to show a first orifice in communication with the first and second chambers, and which has a central axes aligned with a longitudinal axis of the enclosure as claimed. For at least this reason, it is respectfully submitted that the rejection of claim 22 as allegedly being anticipated by Notman is in error and should be withdrawn.

Discussion re: Patentability of Claim 24

Claim 24 also stands rejected as allegedly being anticipated by Notman. Claim 24 depends from and incorporates all of the limitations of claim 22. Accordingly, for at least the same reasons as those set forth above in connection with claim 22, it is respectfully submitted that claim 24 is patentable over the prior art.

**Third Claim Grouping: Claim 21 is Not Obvious
 Over Notman**

Discussion re: Patentability of Claim 21

1. Claim 21 depends from Claim 1

As an initial matter, claim 21 depends (indirectly) from and incorporates all the limitations of claim 1. Accordingly, claim 21 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

2. Additional Limitations of Claim 21

Claim 21 depends on claim 2, which further recites a second partition in the enclosure, as well as a second orifice in the second partition. Claim 21 also recites the following limitations:

said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

As a consequence, the first orifice is the largest orifice of the first partition and has a central axis that is offset from the central axis of the largest orifice of the second partition.

3. Notman Does Not Teach or Suggest Partitions with Offset Orifices

Notman does not disclose a device having first and second partitions having offset largest orifices. In particular, the Examiner has alleged that the first and second partitions of Notman are the catalyst beds 12a and 12b. The Examiner admitted, however, that "Notman does not teach that his first and second orifice comprise the largest orifice in his first and second partitions respectively such that the central axis of the first and second

orifice are offset relative to each other." (Final Office Action at p.5).

The Examiner contended, nevertheless, that:

"It would have been obvious to one of ordinary skill in the art . . . to optimize the dimension of Notman's orifice in each of the first and second partitions such that the largest orifice of each partition produce axis that are offset relative to each other. . .

Motivation . . . to optimize the dimension of Notman's orifice in each of the first and second partitions such that the largest orifice of each partition produce axis that are offset relative to each other, . . . is to provide for longer residence time for the flowing gasses (column 3, lines 7-8; column 4, lines 12-17).

(Final Office Action at p.6). Applicants submit that the Examiner has not alleged a legally sufficient motivation or suggestion to modify Notman's device to include largest orifices in the two partitions that have offset central axes.

First, contrary to the Examiner's assertions, Notman does not suggest the desirability of providing longer residence time for the flowing gasses. Second, Notman does not suggest that the use of partitions having offset largest orifices would provide longer gas residence time.

With regard to the desirability of providing longer residence time, the Examiner cited Notman at columns 3 and 4. (Final Office Action at p.6). The passages cited by the Examiner as providing support for this proposition are set forth below:

. . . united. More than two subdivisions can be provided, but at the cost of some complexity in piping.

. . .

. . . higher pressures. The volume space velocity through the total catalyst is suitably in the range of 5000-50,000 hour⁻¹. The gas passed over the catalyst is normally a mixture of fresh synthesis gas and unreacted gas recycled from methanol recovery by cooling, condensation and separation.

(Notman at col. 3, lines 7-8 and col. 4, lines 12-17).

Nowhere in the above cited passages is there any remote implication that there is a desire to increase gas residence time. There certainly is no teaching or suggestion in the prior art that employing two largest orifices in partitions such that they are offset with

respect to each other constitutes a desirable or efficient manner to increase gas residence time.

For at least these reasons, it is respectfully submitted that the Examiner has failed to set forth a prima facie case of obviousness with respect to claim 21. Accordingly, for reasons independent of those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claim 21 is in error and should be reversed.

**Fourth Claim Grouping: Claim 23 is Not Obvious
Over Notman**

Discussion re: Patentability of Claim 23

1. Claim 23 depends from Claim 22

As an initial matter, claim 23 depends from and incorporates all the limitations of claim 22. Accordingly, claim 23 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 22.

2. Additional Limitations of Claims 23

Claims 23 also recites the following limitations:

the gas port is disposed between the inlet and the outlet of the passageway

Accordingly, claim 23 adds a limitation similar to that discussed above in connection with claim 1.

As discussed above, Notman does not disclose a gas port disposed between the inlet and the outlet of the passageway of the gas connector. In contrast to the rejection of

claim 1, however, the Examiner does not allege that Notman *teaches* such a limitation in connection with claim 23. (Final Office Action at p.5). Instead, the Examiner merely asserts that it would have been *obvious* to “optimize the dimension (height) of Notman’s gas connector passageway such that his gas port is disposed between the inlet and outlet of his passage way . . . to provide for longer residence time for the flowing gasses.” (*Id.* at p.6).

Again, the motivation cited by the Examiner for such a modification is allegedly to “provide for longer residence time for the flowing gasses.” As discussed above in connection with claim 21, Notman does not disclose any necessity or desirability for “provid[ing] for longer residence time for the flowing gasses”. As a consequence, the Examiner has not provided a legally sufficient motivation or suggestion to modify Notman.

In addition, the Examiner proposed that optimizing the height of the gas connector would somehow result in the gas port being disposed between the inlet and the outlet of the gas connector passageway. The Examiner’s proposition that optimizing the height of the gas connector would result in the repositioning of the gas port in a manner consistent with claim 1 is merely speculative. Even if there were a motivation to change the height of the heat exchanger 40 (the alleged gas connector), that could be accomplished in any number of ways without the sparger 30 being located between the main feed 34 and the feed holes 32 of Notman.

For all of the above reasons, it is respectfully submitted that the obviousness rejection should be reversed for reasons independent of those set forth above in connection with claim 21.

Fifth Claim Grouping: **Claims 11-14 are Not Obvious Over Mundt in view of Notman**

Discussion re: Patentability of Claim 11

1. Claim 11

Claim 11 is directed to an arrangement for abating effluent that includes an enclosure, a gas connector, a gas dispensor, an exit port and an etch apparatus. The enclosure, gas connector, gas dispensor and exit port include many, but not all of the limitations of corresponding elements of claim 1. Claim 11, however, cites the following additional limitations corresponding to the etch apparatus:

an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

2. The Examiner's Rejection of Claim 11

The Examiner rejected claim 11 as allegedly being obvious over Mundt in view of Notman. The Examiner admitted that Notman does not teach the claimed etch apparatus. Instead, the Examiner contended that it would have been obvious to replace Mundt's process effluent abatement arrangement with the catalytic gas reactor of Notman. (Final Office Action at p.7).

In particular, the Examiner cited the following reasoning for modifying the process effluent abatement arrangement of Mundt:

Motivation to replace Mundt's process effluent abatement arrangement with Alan Notman's catalytic gas reactor to process the effluent from Mundt's etch apparatus is to reduce the hazardous process chemicals from the etch reactor as taught by Mundt (column 1, lines 22-33).

(Final Office Action at p.7).

3. The Examiner Has Not Identified A Legally Sufficient Motivation to Combine

The above-quoted paragraph does not establish a legally sufficient motivation or suggestion to modify Mundt as proposed by the Examiner. Applicants respectfully submit that Mundt does not suggest that a catalytic converter of the type disclosed in Notman would reduce hazardous process chemicals. The passages of Mundt cited by the Examiner in support of this proposition are set forth below:

One example of a technology which may readily implement the present invention is the semiconductor fabrication industry. This industry is making increased use of low pressure operations such as plasma etching, plasma assisted deposition and the like. These processes require sophisticated vacuum pumping systems having expensive parts and often using expensive, inert pump oil. Since corrosive gases are utilized in these processes, the unreacted gases or the reaction by-products of these gases can be harmful to the pump system; it is thus desirable that they be treated prior to their passage into the pump mechanism. Presently, the treatment of these materials is done in two ways.

(Mundt at col. 1, lines 22-33).

The above-cited portions of Mundt do not suggest that the effluent abatement arrangement taught by Mundt should be replaced at all, much less replaced by the catalytic converter taught by Notman. Mundt adequately describes a reaction chamber specially designed for use in the abatement of effluents in an etch apparatus. (See *id.* at cols. 5 and 6). Nothing in Mundt suggests replacing this reaction chamber with a different structure that has otherwise been designed for a different purpose.

In particular, Notman is directed to a device used for the exothermic synthesis of ammonia or methanol. (Notman at col. 1, lines 4-6). Nothing in Mundt suggests a device that performs exothermic synthesis of ammonia or methanol would be an adequate replacement for the reaction chamber of Mundt, much less a *desirable* replacement.

Accordingly, the Examiner has not set forth a legally sufficient motivation or suggestion to replace the effluent abatement apparatus of Mundt with the exothermic synthesis reactor of Notman. For at least this reason, the obviousness rejection of claim 7 is in error and should be reversed.

Discussion re: Patentability of Claims 12-14

Claims 12-14 stand rejected over Mundt in view of Notman in further view of McGinness. Claims 12-14 all depend from and incorporate all of the limitations of claim 11. As discussed above, there is no legally sufficient motivation or suggestion to combine Mundt and Notman as proposed by the Examiner. McGinness does not supply the missing motivation or suggestion. Accordingly, for at least the same reasons as those set forth above in connection with claim 11, it is respectfully submitted that claims 12-14 are patentable over the prior art.

Sixth Claim Grouping: **Claim 7 is Not Obvious**
Over Mundt in view of Notman

Discussion re: Patentability of Claim 7

1. Claim 7 depends from Claim 1

As an initial matter, claim 7 depends from and incorporates all the limitations of claim 1. While the rejection of claim 7 is over Mundt in view of Notman, Mundt does not overcome the deficiencies of Notman with respect to claim 1, discussed above. Accordingly, claim 7 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

2. Additional Limitations of Claims 7

Claims 7 also recites the following limitations:

an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

As discussed above in connection with claim 11, there is no motivation or suggestion to combine Mundt and Notman as proposed by the Examiner. Accordingly, for reasons independent of those set forth above in connection with claim 1, it is submitted that the obviousness rejection of claim 7 is in error and should be reversed.

(9) CONCLUSION

For all of the foregoing reasons, claims 1-3, 5, 8, 10, 17-21, 27-34 and 39-45 are not unpatentable under 35 U.S.C. § 102(b), and claims 4, 6, 7, 9, 11-16, 22-26 and 35-38 are not unpatentable under 35 U.S.C. § 103(a). As a consequence, the Board of Appeals is respectfully requested to reverse the rejection of these claims.

Respectfully submitted,



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CLAIM APPENDIX

1. (amended) A process effluent abatement arrangement, comprising:
 - an enclosure which defines an interior void;
 - a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber;
 - a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure, said gas port being downstream of said inlet and upstream of said outlet;
 - a gas dispenser in direct fluid communication with said second chamber of said enclosure; and
 - an exit port in fluid communication with said interior void.

2. The arrangement of claim 1, further comprising:
 - a second partition having a second orifice defined therein, wherein (i) said second partition is positioned within said second chamber, (ii) said first orifice has a first central axis, (iii) said second orifice has a second central axis, and (iv) said second central axis of said second orifice is offset relative to said first central axis of said first orifice.

3. The arrangement of claim 2, further comprising:

- a third partition having a third orifice defined therein;
- a fourth partition having a fourth orifice defined therein;
- a fifth partition having a fifth orifice defined therein; and
- a sixth partition having a sixth orifice defined therein,

wherein said second partition, said third partition, said fourth partition, said fifth partition, and said sixth partition are all positioned within said second chamber such that said second chamber is divided into a first sub-chamber, a second sub-chamber, a third sub-chamber, a fourth sub-chamber, a fifth sub-chamber, and a sixth sub-chamber.

4. The arrangement of claim 3, wherein:

each of said first partition, said second partition, said third partition, said fourth partition, said fifth partition, and said sixth partition are spaced apart along a longitudinal axis of said enclosure so that said longitudinal axis passes through a center point P_1 of said first partition, a center point P_2 of said second partition, a center point P_3 of said third partition, a center point P_4 of said fourth partition, a center point P_5 of said fifth partition, and a center point P_6 of said sixth partition, and

said second partition is positioned adjacent to said first partition such that (i) said first sub-chamber is interposed said first partition and said second partition and (ii) said first orifice is in direct fluid communication with said first chamber and said first sub-chamber,

said third partition is positioned adjacent to said second partition such that (i) said second sub-chamber is interposed said second partition and said third partition and (ii) said second orifice is in direct fluid communication with said first sub-chamber and said second sub-chamber,

said fourth partition is positioned adjacent to said third partition such that (i) said third sub-chamber is interposed said third partition and said fourth partition and (ii) said third orifice is in direct fluid communication with said second sub-chamber and said third sub-chamber,

said fifth partition is positioned adjacent to said fourth partition such that (i) said fourth sub-chamber is interposed said fourth partition and said fifth partition and (ii) said fourth orifice is in direct fluid communication with said third sub-chamber and said fourth sub-chamber,

said sixth partition is positioned adjacent to said fifth partition such that (i) said fifth sub-chamber is interposed said fifth partition and said sixth partition and (ii) said fifth orifice is in direct fluid communication with said fourth sub-chamber and said fifth sub-chamber, and

an end wall of said enclosure is positioned adjacent to said sixth partition such that (i) said sixth sub-chamber is interposed said end wall and said sixth partition and (ii) said sixth orifice is in direct fluid communication with said fifth sub-chamber and said sixth sub-chamber.

5. The arrangement of claim 4, wherein:

said third orifice has a third central axis and said third central axis of said third orifice is offset relative to said second central axis of said second orifice,

said fourth orifice has a fourth central axis and said fourth central axis of said fourth orifice is offset relative to said third central axis of said third orifice,

said fifth orifice has a fifth central axis and said fifth central axis of said fifth orifice is offset relative to said fourth central axis of said fourth orifice, and

said sixth orifice has a sixth central axis and said sixth central axis of said sixth orifice is offset relative to said fifth central axis of said fifth orifice.

6. The arrangement of claim 5, wherein:

said longitudinal axis divides said enclosure into a first half and a second half, said first central axis of said first orifice is aligned with said longitudinal axis,

said second orifice of said second partition, said fourth orifice of said fourth partition, and said sixth orifice of said sixth partition are located within said first half of said enclosure, and

said third orifice of said third partition and said fifth orifice of said fifth partition are located within said second half of said enclosure.

7. The arrangement of claim 1, further comprising:

an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

8. The apparatus of claim 1, further comprising:

a gas source containing a gas, said gas source being in fluid communication with said gas port of said gas connector such that said gas contained by said gas source is advanced into said passageway of said gas connector.

9. The apparatus of claim 8, further comprising:

an electrical heating element which is in thermal communication with said gas provided by said gas source so that said gas is heated prior to being advanced into said passageway of said gas connector.

10. The apparatus of claim 1, further comprising:

a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said second chamber of said enclosure.

11. An arrangement for abating effluent, comprising:
 - an enclosure which defines an interior void;
 - a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in fluid communication with said interior void of said enclosure;
 - a gas dispenser in fluid communication with said interior void of said enclosure;
 - an exit port in fluid communication with said interior void of said enclosure; and
 - an etch apparatus which generates an etch gas product, said etch apparatus being in fluid communication with said gas connector such that said etch gas product generated by said etch apparatus is advanced into said interior void of said enclosure.

12. The arrangement of claim 11, further comprising:
 - a gas source containing a gas, said gas source being in fluid communication with said gas port of said gas connector such that said gas contained by said gas source is advanced into said passageway of said gas connector; and
 - a heating element which is in thermal communication with said gas provided by said gas source so that said gas is heated prior to being advanced into said passageway of said gas connector.

13. The arrangement of claim 12, further comprising:

a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said interior void of said enclosure.

14. The arrangement of claim 13, further comprising:

a first partition having a first orifice defined therein, said first partition being positioned within said interior void of said enclosure such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber; and

a second partition having a second orifice defined therein, wherein (i) said gas connector is in fluid communication with said interior void such that said etch gas product generated by said etch apparatus is advanced directly into said first chamber of said interior void, (ii) said second partition is positioned within said second chamber of said interior void, (iii) said gas dispenser is in fluid communication with said interior void such that said humidified gas is advanced directly into said second chamber of said interior void, (iv) said first orifice has a first central axis, (v) said second orifice has a second central axis, and (vi) said second central axis of said second orifice is offset relative to said first central axis of said first orifice.

21. The arrangement of claim 2, wherein said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

22. A process effluent abatement arrangement, comprising:

an enclosure which defines an interior void and a longitudinal axis;

a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber;

a second partition having a second orifice defined therein, wherein (i) said second partition is positioned within said second chamber, (ii) said first orifice has a first central axis that is substantially aligned with the longitudinal axis of the enclosure, said first central axis being unobstructed such that gas can pass from the first chamber to the second chamber through the first central axis, (iii) said second orifice has a second central axis, and (iv) said second central axis of said second orifice is offset relative to said first central axis of said first orifice;

a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure;

a gas dispenser in direct fluid communication with said second chamber of said enclosure; and

an exit port in fluid communication with said interior void.

23. The arrangement of claim 22, wherein the gas port is disposed between the inlet and the outlet of the passageway.

24. The arrangement of claim 22, further comprising:
a humidified gas source for providing a humidified gas, said humidified gas source being in fluid communication with said gas dispenser such that said humidified gas is advanced into said gas dispenser and into said second chamber of said enclosure.

25. The method of claim 22, wherein said first orifice comprises a largest orifice in said first partition, and said second orifice comprises a largest orifice in said second partition.

26. The method of claim 25, further comprising at least one additional partition in addition to said first partition and said second partition, each said additional partition having a respective largest orifice, said longitudinal axis dividing said enclosure into a first half and a second half, said largest orifices of said first partition, said second partition, and said at least one additional partition being alternatingly disposed in said first half and said second half.



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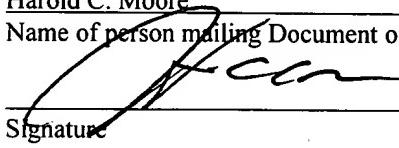
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Signature

January 5, 2004

Date of Signature

Re: Application of: Williams et al.
Serial No.: 09/942,330
Filed: August 29, 2001
For: Arrangement and Method for Abating
Effluent from a Process
Group Art Unit: 1763
Examiner: Rudy Zervigon
Our Docket No.: 01-330 (1003-0607)

TRANSMITTAL OF BRIEF ON APPEAL

Please find for filing in connection with the above patent application the following documents:

1. Original of the Appeal Brief;
2. Three (3) copies of the Appeal Brief; and
3. One (1) return post card.

Commissioner for Patents

January 5, 2004

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The Commissioner is hereby authorized to charge the filing fee of an Appeal Brief (\$330.00) as required by 37 C.F.R. § 1.17(e) to **Deposit Account No. 12-2252**.

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Respectfully Submitted,

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January 5, 2004

Enclosures